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EDITORIAL.

The Sungei Manik Padi Scheme.

The development of the policy for the opening up and efficient irrigation of a large area at Sungei Manik in Perak to render this land suitable for padi cultivation is recorded in another part of this Journal. The author of the article, Mr. A. V. Aston, is the District Officer, Lower Perak, and as such is primarily responsible for the administration of this new area. He has provided a clear-cut picture of the progress achieved during the past year, and of particular interest are the steps that have been taken to speed up the work and at the same time to guard against mistakes in colonization which might retard future progress.

For the first time in the history of the Scheme there was a substantial exportable surplus of padi from the earliest developed area, and as is pointed out by the author, "this excess of production over domestic requirements marked an important step towards the fulfilment of one of the objects of the Scheme, which is the supply of rice for external sale." It is satisfactory to note that organization to deal with this exportable surplus was at hand.

Mr. Aston's account speaks of various arrangements to foster the development of this area: the provision of a mill, a guaranteed price for padi, a prize scheme for cultivation, concessions as regards payment of water rate, the provision of a school, medical and health services, and payment of a bonus for rapid clearing of holdings. Readers may gain the impression from these "concessions" that the Scheme is bolstered up by artificial means. We would emphasize, however, that any idea of pampering the colonists or of working an uneconomic system is far from the truth. Even if the production costs were greater than the import price of padi, which is not the case, it would be justified on the grounds of policy. But the production of padi on this area is expected to be an economic proposition, economic not from the country's point of view alone but from the producer's point of view. It is true that the Government seeks to offer certain amenities of life to the cultivator, schools, medical treatment, communications and so on; these are, however, only those that are offered by Governments in all centres of population. In the development of an area such as this we create a centre of population; the least that can be done in justice to the settlers is to provide them with a few of the amenities of life. Those

who have any personal knowledge of the feeling of isolation that can be felt by settlers on a new area will appreciate the justice of ameliorating their conditions at the very start; we feel sure that if the cultivators settle and develop their holdings they will have amply earned any degree of comfort they may have, and the country will still be in their debt.

The Rubber Industry in 1939.

We publish in this number a comprehensive review of the progress of the Malayan rubber producing industry which includes the latest official statistics concerning areas, production and exports.

Advisedly we speak of progress; under the Rubber Regulation Scheme the production of rubber is restricted, but in every other aspect the year has been one of progress for the industry. On both large estates and small holdings increasing attention has been given to the yielding capacity of the properties; we believe that the wisdom of this policy will become evident in the future, for it will assist the industry to meet marketing difficulties by cheaper production and without, as in the past, detriment to the general upkeep of the estate.

In the past owners have frequently lacked a sufficiently defined policy and estates have drifted between prosperity and penury as booms and slumps alternated. With the carefully planned programmes of development and improvement now usual on most estates we see the foundations laid for greater stability of the industry and a consequent ability to meet and withstand future market vicissitudes.

Manuring of Lowland Tea.

Experiments conducted at the Central Experiment Station, Serdang, on the manuring of lowland tea are the subject of an article in this number. The investigations have proceeded sufficiently to provide indications upon which at least an interim policy of manuring on estates may be based.

Under the conditions obtaining at Serdang it has been found that over a period of between two and three years yields have been maintained at just as high a level by the use of complete inorganic manures or sulphate of ammonia alone as by a more complex organic manure. For estate practice, therefore, it is recommended that sulphate of ammonia alone be used until such time as experiments have shown that elements other than nitrogen are beneficial.

Tea planters will need no reminder that the avoidance of complicated systems of manuring has a direct bearing on the economy of production, and they will, no doubt, proceed to variations of the system recommended only after they have satisfied themselves by experiment that more expensive manures are likely to be justified by correspondingly increased yields of tea.

Original Articles.

MANURIAL EXPERIMENTS WITH TEA AT THE CENTRAL EXPERIMENT STATION, SERDANG,

BY
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Introductory.

The present article describes some exploratory manurial experiments being carried out with tea at the Central Experiment Station, Serdang. Although the experiments have been in progress for only a few years the results obtained to-date are considered of sufficient importance to justify their being brought to the notice of the lowland planting tea interests of Malaya. The investigation is being continued and further results will be published in due course.

Site of Experiments.

The experiments are laid out in Field 16B on gently sloping land facing east. The soil is a sandy clay loam of the Hill Quartzite group and is of medium fertility.

History of Experimental Plots.

The following is a history of the tea plants to the time of laying down the experiments. ([1] & [2])

The area was cleared from light jungle during 1921 and planted with pine-apples. This crop was removed during January, 1929, and the land ploughed and contour silt-pitted immediately before lining.

During May, 1929, the area was planted with young seedlings of a pure Manipuri jat raised from imported seed. The planting distance adopted was 4 ft. × 3½ ft., giving 3,111 plants per acre.

A complete (NPK) organic manurial mixture, containing whale guano compound, was applied to the land at the rate of 300 lbs. per acre when the seedlings were planted. The composition of the mixture was as follows:—

	lbs.
Whale guano compound	50
Sulphate of ammonia	50
Superphosphate	150
Sulphate of potash	50
Total	300

In September, 1930, the young plants were pruned back to a height of 4 ins. above the collar.

During October, 1930, vetiver grass (*Vetiveria odorata*) was planted on the bunds of the contour silt-pits with a view to holding the soil in position. During the same month seedlings of *Albizzia falcata* shade trees were planted at 32 ft. x 32 ft. square spacing (42 per acre) together with cuttings of *Gliricidia maculata*. The latter were established in rows between the *A. falcata* at a distance of 16 ft. apart in the rows.

Later, when the overhead shade thrown by the *A. falcata* tended to become too dense, alternate trees were removed leaving a stand of 21 trees per acre. Unlike the *A. falcata*, the *G. maculata* did not show marked development.

During November, 1931, the bushes were pruned, manured with the complete (NPK) standard organic pruning mixture in use on the Station at the rate of 400 lbs. per acre and the fallen leaves buried by the operation known as envelope-forking. The composition of the pruning mixture was as follows:—

	lbs.
Whale guano compound ...	150
Sulphate of ammonia	50
Nitrate of soda	50
Rock phosphate	100
Sulphate of potash	50
Total ...	400

Tipping commenced in April, 1932, and the plucking round started. During part of June and July, 1933, the area was rested to allow the bushes to recuperate from the effects of a termite attack. Plucking continued until November, 1933, when the bushes were pruned back to within 2 to 3 ins. of the previous cuts and manured with the same complete (NPK) organic pruning mixture at the rate of 400 lbs. per acre.

Plucking was resumed in March, 1934. In December, 1935, a complete (NPK) inorganic manurial mixture of the following composition was applied at the rate of 250 lbs. per acre.

	lbs.
Sulphate of ammonia	100
Rock phosphate	100
Sulphate of potash	50
Total ...	250

Plucking continued until October, 1936, when pruning was again undertaken and the manurial treatments inaugurated as from November, 1936.

Lay-out of Experiment.

The experimental area consists of 36 plots arranged in a Latin Square lay-out with single guard-rows separating each plot from those adjacent to it. Each plot, of approximately 1/20th acre, consists of 10 rows of 16 bushes.

Preliminary yields taken originally over a six months' period from March to September, 1935, and then extended over a further nine months from October, 1935, to July, 1936, showed that individual plot yields were very uniform. The experimental treatments were therefore randomized within the Latin Square lay-out.

First Series of Manurial Treatments.

The main objects of the investigation were to ascertain whether the complete standard organic pruning mixture could be replaced without loss of crop by (a) a simpler inorganic mixture containing the equivalent amounts of nitrogen, phosphate and potash, or (b) an inorganic manure containing only nitrogen, since it is known that nitrogen is the most important element in tea manuring. At the same time information was sought as to the value of growing leguminous green manures between the rows of tea bushes with the object of incorporating the cuttings into the soil or using them as a mulch on the land.

The details of the treatments as originally applied in November, 1936, immediately after pruning, together with rates of application of the different manures, are shown below.

A. Complete organic mixture.

	lbs.
Whale guano compound	150
Sulphate of ammonia	50
Nitrate of soda	50
Rock phosphate	100
Sulphate of potash	50
...	———
Total per acre. ...	400

B. Complete organic mixture as in treatment A and in addition *Crotalaria usaramoensis* planted between alternate rows of bushes.

C. Inorganic equivalent of complete organic mixture as in Treatment A.

	lbs.
Sulphate of ammonia	137
Rock phosphate	136
Sulphate of potash	50
———	———
Total per acre. ...	323

D. Complete inorganic mixtures as in Treatment C and in addition *C. usaramoensis* planted between alternate rows of bushes.

E. Inorganic nitrogenous manure.
Sulphate of ammonia ... ... 194 lbs. per acre.

F. Inorganic nitrogenous manure as in Treatment E and in addition *C. usaramoensis* planted between alternate rows of bushes.

The manures were applied at the calculated rate per bush in a circle about 3 ft. diameter and envelope-forked into the soil.

Seed of *C. usaramoensis* was also sown as indicated in the plots under Treatments B, D, and F, but establishment of the cover plants was poor. Sowings were repeated in March, 1937, and again at the commencement of 1938, but with no success on either occasion.

In April, 1938, seed of *C. anagyroides*, mixed with basic slag, was sown in order to endeavour to effect an improvement in establishing a green manure crop. An equal amount of basic slag was applied to each of the other three series of plots in order to maintain equality of treatment in this respect throughout the whole experiment.

This attempt was, however, also unsuccessful. It seems reasonable to suppose, therefore, that the repeated failures to establish legumes are due to the intense root competition, also to the shade produced by the tea bushes and the *A. falcata* trees.

A second application of manures at the previous rates was made in February, 1938.

Second Series of Manurial Treatments.

In December, 1938, a change was made in the rates of application of manures. Treatments A, C and E remained unchanged, but B, D and F were altered to double quantities of A, C and E as shown below:—

A. Complete organic mixture.

	lbs.
Whale guano compound	150
Sulphate of ammonia	50
Nitrate of soda	50
Rock phosphate	100
Sulphate of potash	50
Total per acre ...	400

B. Complete organic mixture at double the rate in Treatment A.

	lbs.
Whale guano compound	300
Sulphate of ammonia	100
Nitrate of soda	100
Rock phosphate	200
Sulphate of potash	100
Total per acre. ...	800

C. Inorganic equivalent of complete organic mixture as in Treatment A.

	lbs.
Sulphate of ammonia	137
Rock phosphate	136
Sulphate of potash	50
Total per acre. ...	323

D. Inorganic equivalent of complete organic mixture as in Treatment B.

	lbs.
Sulphate of ammonia	274
Rock phosphate	272
Sulphate of potash	100
Total per acre ...	646

E. Inorganic nitrogenous manure.
Sulphate of ammonia ... ... 194 lbs. per acre.

F. Inorganic nitrogenous manure at double the rate in Treatment E.
Sulphate of ammonia ... ... 388 lbs. per acre.

System of Plucking.

Tipping commenced in February, 1937, and plucking yields recorded as from May, 1937.

A system of fine plucking has been adopted throughout the experiment. During wet weather leaf is plucked every 7 to 8 days, but during the dry season when growth is slower and the bushes produce less " flush " the plucking interval may be extended up to 11 or 12 days.

Leaf is plucked from those shoots which display either two or three expanded leaves. In the case of the former a bud and two leaves are taken, leaving only the small " fish " leaf; with the latter a bud and two leaves are also taken but one normal leaf is left on the shoot above the "fish" leaf.

Yields of Leaf.

The crop from each plot was weighed in the field as green leaf and the figure converted into made-tea by multiplying the weight of green leaf by the factor 0.23.

The equivalent yield figures of made-tea calculated in lbs. per acre for the varying periods of plucking and the different manurial treatments are shown in Tables I and II respectively.

Table I.
Calculated Yields of Made-Tea following First Manurial Treatments.

(Results expressed in lbs. per acre).

Details of Treatment	May to December, 1937	January to December, 1938	Treatment Totals	Treatment Means
A. Complete organic mixture ...	447	1,470	1,917	958
B. A + green manure ...	438	1,457	1,895	947
C. Complete inorganic mixture ...	453	1,453	1,906	953
D. C. + green manure ...	455	1,464	1,919	959
E. Sulphate of ammonia ...	461	1,440	1,901	950
F. E + green manure ...	451	1,457	1,908	954
Total ...	2,705	8,741	11,446	
Mean ...	451	1,457	1,908	953

Table II.
Calculated Yields of Made-Tea following Second Manurial Treatments.

(Results expressed in lbs. per acre).

Details of Treatment	January to August, 1939
A. Complete organic mixture ...	1,076
B. Complete organic mixture at double rate as in A ...	1,083
C. Complete inorganic mixture ...	1,104
D. Complete inorganic mixture at double rate as in C ...	1,120
E. Sulphate of ammonia ...	1,101
F. Sulphate of ammonia at double rate as in E ...	1,087
Total ...	6,571
Mean ...	1,095

Discussion of Results.

The manurial mixtures under consideration may be regarded as fairly quick-acting and, since they were first applied in November, 1936, it would have been reasonable to expect some influence on the yield of leaf during the period May to December, 1937. The results during this period indicate, however, no differences in yield due to manures.

The same manurial treatments were repeated in February, 1938, so that during the remainder of that year the bushes had the benefit both of the quick-acting constituents of the second application and of any residual effect from the first one. The figures for 1938 still indicate, however, no differences in yield due to treatments.

The calculated mean yield of made-tea over the whole experimental area during 1938 amounts to approximately 1,450 lbs. per acre. This may be considered a very satisfactory yield.

As regards the green manure treatments, no positive results were obtained owing to the impracticability of establishing legumes in an area of vigorous mature tea.

The yields during the first 8 months of 1939, following the changes in manurial treatments at the end of 1938, still show no differences due to treatments. Figures increased to a still slightly higher level, being approximately 1,100 lbs. of made-tea per acre, which is equivalent to an annual production of about 1,650 lbs. per acre.

No satisfactory explanation can be offered for the lack of response shown by the bushes in the plots receiving double dressings of manures.

Future Programme of Work.

Commencing from the middle of August, 1939, the whole of the experimental area was rested for 6 weeks prior to pruning, following which the manurial treatments were again modified. Treatments A, C and E remained unaltered, but plots under treatments B, D and F, which had previously received double dressings, were left unmanured.

Conclusions.

The experiments have shown that throughout the period of between 2 and 3 years yields have been maintained at just as high a level by the use of complete inorganic manures or sulphate of ammonia alone as by a more complex organic mixture. This is in agreement with findings in India.[3]

For estate practice it is therefore recommended that sulphate of ammonia alone be used until such time as it may be shown that elements other than nitrogen are beneficial.

Summary.

1. A description is given of various manurial experiments carried out on mature tea at the Central Experiment Station, Serdang.

2. The main manurial treatments were: (a) complete organic mixture, (b) complete inorganic mixture, and (c) sulphate of ammonia alone.

3. Taken over a period extending between 2 and 3 years the results indicate that sulphate of ammonia will maintain yields at the same high level as the more complex inorganic or organic mixtures.

References.

1. Guide to the Government Experimental Plantation, Serdang, 1931.

2. Greig, J. L. The Cultivation of Lowland Tea at the Central Experiment Station, Serdang. Special Bulletin, General Series, No. 29, 1937.

3. Cooper, H. R. Nitrogen Supply to Tea. Indian Tea Association, Tocklai Experiment Station, Memorandum No. 6, 1939.

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THE MALAYAN RUBBER PLANTING INDUSTRY IN 1939.

Compiled from Official and Other Records by the Economics Branch of the Department of Agriculture, S.S. and F.M.S.

Prices.

The Singapore price of Ribbed Smoked Sheet at the beginning of the year was 28¼ cents per lb., but before the end of January dropped to 25¼ cents. With minor fluctuations the price then appreciated until in the second week of March it stood at 29 cents. Thereafter until the third week of August the price varied between 26½ cents and 29 cents. The price rose sharply during the first week of September and reached 29 cents per lb. on the 11th. By the 27th of that month it had declined to 33 cents; thereafter with fluctuations the tendency was upwards until on 25th November it reached the highest price since April, 1937, *viz.* 40½ cents per lb. Thereafter until the end of the year the market showed a lower tendency and ended the year at 37 7/8 cents per lb.

The average prices per lb. for the year in the principal markets are shown in Table 1, together with corresponding figures for the two preceding years.

Table I.
Prices of Rubber per lb.

(No. 1. X. Ribbed Smoked Sheet.)

	1937	1938	1939
Singapore (cents, Malayan) ...	32.09	24.39	31.00
London (pence, sterling) ...	9.42	7.29	8.97
New York (cents, gold) ...	16.30	14.56	17.45

Areas.

The total area under rubber in Malaya at the end of 1939 was estimated to be 3,442,649 acres, distributed as shown in Table II.

Budgrafted Areas on Estates.

Table III shows the area budgrafted on estates at the end of 1939, together with corresponding figures for the previous years.

At the end of 1939, of the total area of budded rubber (284,275 acres), 174,197 acres had reached the tappable stage, while 123,382 acres were actually being tapped. At the end of 1938, 101,410 acres of budded rubber were being tapped.

Table II.
Area under Rubber in Malaya as at end of 1939.

(acres).

State or Territory	Estates§†			Small Holdings*	Total Planted Area
	Mature‡ Area	Immature Area	Total Planted Area	Total Planted Area	
Perak ...	280,496	34,123	314,619	269,780	584,399
Selangor ...	313,371	45,732	359,103	148,480	507,583
Negri Sembilan ...	259,864	30,681	290,545	105,520	396,065
Pahang ...	84,860	17,205	102,065	98,607	200,672
Total F.M.S. ...	938,591	127,741	1,066,332	622,387	1,688,719
Malacca ...	116,810	12,004	128,814	71,129	199,943
Province Wellesley ...	42,665	2,223	45,088	23,858	68,946
Penang ...	2,546	373	2,919	15,167	18,086
Singapore ...	31,883	440	32,323	20,482	52,805
Labuan ...	—	—	—	1,908	1,908
Total S.S. ...	194,104	15,040	209,144	132,544	341,688
Johore ...	474,801	81,795	556,596	384,533	941,129
Kedah ...	200,285	16,130	216,415	96,604	313,019
Perlis ...	1,450	282	1,732	3,613	5,345
Kelantan ...	30,926	3,013	33,939	60,337	94,276
Trengganu ...	14,888	1,219	16,107	27,396	43,503
Brunei ...	6,291	561	6,852	8,118	14,970
Total U.M.S. ...	728,641	103,000	831,641	580,601	1,412,242
TOTAL MALAYA ...	1,861,336	245,781	2,107,117	1,335,532	3,442,649

‡ Mature area represents acreage planted in season 1931-32 or earlier.

§ Estates = 100 acres and over. * Small holdings = under 100 acres.

† Owing to areas newly planted during 1939 some small holdings have now increased in area and should be classified as estates, but have not yet been registered as such for the purpose of these statistics.

Table III.
Area of Budgrafted Rubber in Malaya.

(Estates only)

Territory	1937		1938		1939	
	No. of Areas	Total Acreage	No. of Areas	Total Acreage	No. of Areas	Total Acreage
F.M.S. ...	445	120,927	479	138,140	539	159,654
S.S. ...	54	4,634	57	6,681	64	7,694
U.M.S. ...	178	94,364	197	103,770	234	116,927
Total Malaya	677	219,925	733	248,591	837	284,275

Ownership and Constitution of Estates.

Of the total area of rubber on estates, 2,107,117 acres, 74.9 per cent. is European owned, 16.3 per cent. is owned by Chinese, 1.3 per cent. by Indians, and 4.5 per cent. by other nationalities.

There were 2,511 rubber estates recorded in Malaya at the end of 1939, of which 858 (1,540,658 acres) were owned by public limited liability companies; the remainder, 1,653 (566,459 acres), were the property of private limited liability companies or privately owned.

There were 1,541 estates (317,770 acres) between 100 and 500 acres planted area, 360 estates (260,478 acres) between 500 and 1,000 acres, 555 estates (1,117,708 acres) between 1,000 and 5,000 acres, and 55 estates (411,161 acres) over 5,000 acres.

Labour.

The total labour force employed on estates at the end of 1939 was 324,193, composed of 211,871 men, 90,242 women, and 22,080 children, or 15.4 labourers employed per 100 planted acres of rubber. At the end of 1938 the total estate labour force was 296,307 persons, or 14.6 per 100 acres.

The Rubber Regulation Scheme.

The second International Agreement (1st January, 1939, to 31st December, 1943) for the regulation of rubber production was in operation throughout the year. Malaya's basic quota was 632,000 tons out of a world quota of 1,519,000 tons, and the international releases were: for the first half year 50 per cent., third quarter 60 per cent., fourth quarter 75 per cent., averaging 58¾ per cent. over the year, as compared with 55 per cent. in 1938.

Malayan domestic releases under the scheme were 2½ per cent. below the above international releases throughout the year.

Under the terms of the present Agreement, new planting is permitted until the 31st December, 1940, up to 5 per cent. of the total planted area, and after that date, up to percentages to be fixed by the International Rubber Regulation Committtee. Subject to approval by the Controller of Rubber, Malaya, unconditional replanting is also permitted, but the Committee reserves the right to review the position and limit replanting after 1940.

The total area newly planted during 1939 was: estates 92,473 acres, small holdings 47,720 acres, total 140,193 acres. The total area replanted was: estates 36,282 acres, small holdings 10,994 acres, total 47,276 acres.

Production, Exports and Stocks.

The production of rubber in Malaya during 1939 totalled 361,484 tons, as compared with 360,898 tons in 1938, and 503,127 tons in 1937. Table IV shows the distribution.*

Table IV.
Malayan Production of Rubber.

(tons)

Territory	Production by Estates of 100 acres and over	Production by Estates of less than 100 acres	Total Production
Federated Malay States ...	130,038	51,769	181,807
Straits Settlements ...	18,957	9,950	28,907
Unfederated Malay States ...	95,920	54,850	150,770
Total 1939 ...	244,915	116,569	361,484
Total 1938 ...	246,220	114,678	360,898
Total 1937 ...	314,658	188,469	503,127

The exports of rubber in the form of concentrated latex were greater this year than in any previous year. This was due to the increased demand for latex collected from estates for concentration in large plants at centres such as Singapore. The prices paid have been those current for No. 1 ribbed smoked sheet for the estimated rubber content of the latex, the purchaser supplying containers and the necessary ammonia which, added to the latex, prevents coagulation. Several large estates contemplate establishing the necessary machinery to produce concentrated latex, in view of which it is probable that the exports of rubber in this form will advance still further in the future.

* Abstracted from the December statement of acreage, stocks, production, imports and exports of rubber, etc., published by the Registrar-General of Statistics, S.S. and F.M.S.

The exports of rubber in concentrated forms of latex were 22,515 tons, or 7,584 tons greater than in 1938. Quantities and values in the year under review are given in Table V. The quantity of rubber estimated to be contained in this exported latex is included in the figures of production given in Table IV, and also in the figures of total export given in Table VII.

Table V.
Exports of Rubber in Concentrated Forms of Latex.

(tons).

Year	Dry Rubber Content of Latex in lbs. per gallon			Total	Value
	Under 4.8 lbs.	4.8 to 5.7 lbs.	Over 5.7 lbs.		
					$
1931 ...	—	—	—	1,925	472,123
1932 ...	—	—	—	5,192	1,110,103
1933 ...	—	—	—	10,470	2,871,407
1934 ...	—	—	—	14,172	7,119,548
1935 ...	5,286	5,490	2,374	13,150	6,585,369
1936 ...	6,778	7,073	3,086	16,937	10,673,229
1937 ...	7,122	7,512	4,774	19,408	15,429,910
1938 ...	3,630	4,554	6,747	14,931	8,686,793
1939* ...	5,133	13,936†	3,446‡	22,515	16,451,918

Table VI.
Rubber Stocks in Malaya at end of 1938 and 1939.

(tons).

	1938	1939
Stocks at ports	6,152	6,646
Stocks in hands of dealers	31,077	15,548
Stocks on estates of over 100 acres ...	47,670	48,020
Total ...	84,899	70,214

Stocks held by small-holders are considered to be negligible. Local consumption of rubber by manufacturers of rubber goods, tyres, tubes, belting, shoes, etc. amounted to 511 tons.

Table VII summarizes shipments of crude rubber from producing countries since 1931.

* In 1939 there was an import into Malaya of 18 tons valued at $22,733.

† Dry rubber content 4.8 to 5.9 lbs. per gallon.

‡ Over 5.9 lbs. dry rubber content per gallon.

Table VII.
Shipments of Crude Rubber from Producing Countries.*

(tons).

Year	Malaya including Brunei & Labuan	Netherlands Indies	Ceylon	Sarawak	Thailand	French Indo-China	Other Sources	Total
1931	423,000	257,000	62,300	10,400	3,600	11,000	32,700	800,000
1932	406,000	211,000	49,300	7,100	3,000	13,500	18,800	708,700
1933	445,800	282,300	63,800	11,100	7,000	17,300	26,100	853,400
1934	467,400	379,400	79,100	17,600	17,700	19,600	38,300	1,019,100
1935	417,000	282,900	54,300	19,300	28,300	28,700	43,200	873,700
1936	353,700	309,600	49,700	21,000	34,600	40,800	48,500	857,900
1937	469,900	431,700	70,400	25,900	35,600	43,400	62,900	1,139,800
1938	372,000	298,100	49,500	17,800	41,600	59,200	56,700	894,900
1939	376,755	372,396	61,023	24,014	41,266	65,219	64,481	1,005,154

Coagulants.

In the last quarter of the year there was an acute shortage of formic and acetic acids, the usual coagulants. The conservation of acid was recommended by using serum and other alternatives. In co-operation with the Land Offices, the Department of Agriculture distributed formic acid to small-holders in an endeavour to ensure that all small-holders received a fair share of available supplies.

Arrangements were made towards the end of the year for the control by the Controller of Rubber of coagulants from the beginning of 1940, and the Department of Agriculture, in co-operation with the Land Offices, undertook to organize distribution of rationed coagulants, pending more permanent arrangements with licensed dealers.

Conditions on Estates.

Much attention was devoted to the opening of jungle areas. The unfavourable planting weather which prevailed in most parts of the country retarded the planting programmes on many estates and was a contributory cause of heavy supplying owing to the dying out of the plants in the field. The clearing of jungle with the minimum of burning, or with no burn at all, combined with the use of indigenous covers was successfully adopted by several estates. The general standard of new planting is high. Cover crops have been established in most areas, although there is evidence that the cultivation of indigenous plants as a sole cover is receiving considerable attention. Cover crops are invariably established successfully in all replanted areas and the value of mulching with plant refuse as a means of conserving the moisture in the soil is gradually being adopted.

* Compiled from the Statistical Bulletin of the International Rubber Regulation Committee.

The cultivation of some form of ground cover has also now come to be regarded as a feature of estate practice on areas of mature rubber.

Widespread speculation in regard to the relative merits of budgrafted trees and clonal seedlings continues. In the absence of conclusive evidence of the value of clonal seeds, estates have been advised not to plant more than 20 per cent. of their replanting or new planting acreage with clonal seedlings.

Large scale manuring of mature areas has been continued on the majority of estates throughout the country, usually with good results.

The general progress of replanted rubber in the early stages is extremely satisfactory. Manurial experiments on such areas have shown marked responses to phosphate, smaller responses to nitrogen, and no response from potash except on sandy soils. Manuring has not been found to have any effect on coastal clays.

In general, apart from the growing tendency to market concentrated latex, already mentioned, there were no startling departures from established factory procedure. Evidence is accumulating of a growing interest in the Tunnel Smokehouse which is replacing other types. The "Tunnel" has now proved itself in practice and it is anticipated that this type will come into more general use in future.

Areas out of Tapping.

The area out of tapping on estates at the end of the year was 347,416 acres, or 18.7 per cent. of the estimated acreage of tappable rubber. In addition 281,051 acres (15.1 per cent.) were being rested under rotational systems.

Corresponding figures in 1938 were: out of tapping 531,512 acres (24.5 per cent), rested 329,501 acres (17.6 per cent.). The reduction in area out of tapping in 1939 is a reflection of the increased release, in the last quarter especially, under the Rubber Regulation Scheme.

On small holdings (estates of less than 100 acres) it was estimated that 268,500 acres, or 21 per cent. of the total acreage of tappable rubber, were out of tapping at the end of the year. The area of small holdings out of tapping decreased rapidly from the peak figure reached in June, 1939, due to the improved price of rubber and to the increased quota during the year under review. The quarterly surveys of small holdings out of tapping are summarized in Table VIII.

Table VIII.

Percentages of Areas of Tappable Small Holdings out of Tapping.

Territory	Decr. 1938	March 1939	June 1939	September 1939	Decr. 1939
Federated Malay States ...	44.2	52.6	56.4	35.0	30.7
Straits Settlements ...	35.6	40.0	38.5	25.0	20.0
Unfederated Malay States ...	27.7	30.8	29.1	21.0	9.1
Malaya ...	36.4	42.0	43.0	28.0	21.0

Conditions on Small Holdings.

As stated previously considerably increased tapping on small holdings was evident, due to the better price of rubber and the higher release under the Rubber Regulation Scheme. Coupons issued by the Rubber Regulation Department continue to be treated as a separate commodity, being bought by dealers, while frequently rubber is sold without covering coupons. The habit of pledging coupons before they have been issued is becoming more prevalent, the price obtained varying from $3 to $10 per picul below the market value on the day of issue. In some instances coupons have been pledged on these terms for as long as two years in advance, and are then looked upon as a pension.

On most of the older holdings in which renewed bark is now being tapped, bad wounding of the tree is of general occurrence. On the younger holdings, particularly those owned by Chinese, Javanese and Indians, tapping continued to reach a very high standard, particularly when this work was carried out by the owner and his family.

Methods of soil conservation have, in the past, been carried out in very few holdings in which clean weeding was practised. In many of the areas alienated for planting under the new Regulations during the year, however, much work of this nature has been carried out. This is particularly true in Johore, in which State the construction of bunds or terraces together with the planting of leguminous creeping covers is enforced on all undulating or hilly newly alienated land for rubber planting, except on areas of less than 10 acres, which are exempt.

An increased interest in manuring was shown by small-holders. A complete mixture of inorganic manures being available in small quantities, several small-holders undertaking replanting are now using this for their young rubber trees and are, in addition, purchasing rock phosphate for the creeping leguminous covers which many also established.

The greatest interest in manuring, however, was shown by Chinese owners, many of whom purchased large quantities of manures for use both in the field and in budwood nurseries.

Much greater interest was shown in replanting and in the planting of new areas.

At the time of new planting, "share certificates" were issued towards the end of 1938: few Malay small-holders appreciated the purpose for which they were issued, or their true exchange value. Later, when the new Regulations were more fully understood, many who had sold their certificates bought them back at a considerably higher price. Consequently, the amount of new planting now being undertaken by small-holders is much greater than estimated at the beginning of 1939. The area newly planted during 1939 on holdings of less than 100 acres was 47,720 acres. The re-planted area amounted to 10,994 acres.

The first active steps towards providing small-holders with improved planting material were taken in 1930, when small demonstration plots of budgrafted rubber were established on several Agricultural Stations throughout the country. Addi-

tional attempts to increase the interest in the use of improved planting material were made by means of budgrafting demonstrations at local Agricultural Shows and elsewhere. Courses in budgrafting have also been given annually to the students at the School of Agriculture, Malaya, since 1930.

As a result of this propaganda, about 80 acres were budgrafted in 1937, but for various reasons comparatively little interest was aroused. Towards the end of 1938 and during 1939, however, small-holders and Asiatic owners of small estates began to realize the advantage of replanting under the terms of the new Rubber Regulation Agreement. In December, 1938, and January, 1939, about 600 stumps budded with approved clones were established in 14 Agricultural Stations to provide nucleus budwood for multiplication on seedlings planted at the same time in these Stations. As this will be insufficient to meet the demand, a further supply of 2,500 stumps was established in November. A limited amount of budwood was also distributed.

The Small-Holders' Advisory Service, maintained by the Rubber Research Institute of Malaya, continued to give valuable help to small-holders in connexion with all aspects of rubber production. The arrangement made at the inception of this service whereby the Asiatic Rubber Instructors work under the Agricultural Officers of the Department of Agriculture remained unchanged.

The quality of rubber marketed by the small-holder continues to bear evidence of his desire to dispose of his produce as quickly as possible. Efforts to popularize cheap smoke houses have not been an unqualified success, owing to the low premium usually allowed by dealers for an improved product. In consequence, many of the smoke houses erected by small-holders are not used.

The teaching of the correct method of sheet preparation was continued by the Instructors during 1939, but, owing to the shortage of coagulants towards the end of the year, propaganda in this direction became increasingly difficult. The improvement of sheet preparation in Kelantan and Trengganu was encouraging; many small-holders in these States now produce smoked sheet graded as "Chinese Prime."

Pests and Diseases.

The outbreak of *Oidium Heveae*, mildew of rubber tree foliage, was again very mild. Leaf-fall was nowhere serious.

There was a noticeable reduction in the incidence of Mouldy Rot and Pink Disease, due probably to the drier weather experienced in most districts during the last part of 1938 and the whole of 1939. This may also account for the almost complete absence of Phytophthora diseases of the tapping panel and Patch Canker of the main stem.

Mouldy Rot continued to be the most serious disease in small holdings. Despite the fact that the Department continued the policy of selling to small-holders approved fungicides for the control of this disease, tar and other unsuitable substitutes continue to be extensively used.

Root diseases in connexion with replanting were more evident, especially on small holdings, where precautions are generally neglected on account of cost.

Owing possibly to the present system of growing either leguminous or indigenous covers, the incidence of pest attacks increased, but control measures applied successfully dealt with such outbreaks. Termites continued to cause trouble. More attention was given to the control of this pest on small holdings, and chemicals to use in this connexion were made available in some States by the Department at cost price. On estates the methodical treatment of termite attack is an accepted policy.

Acknowledgment.

Acknowledgment is made to the Rubber Research Institute of Malaya for information supplied relating to conditions on estates and small holdings and to pests and diseases.

A REVIEW OF THE SUNGEI MANIK PADI IRRIGATION SCHEME

BY

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Introductory.

What is known, to those interested in the development of padi areas in Malaya. as the Sungei Manik Scheme had as its nucleus some 500 acres of old bendang. The Scheme now in process of development aims at the provision of an adequate irrigation supply and freedom from flooding of some 24,000 acres.

In addition, in order to provide a reasonable mode of life, a further 6,700 acres of forest are reserved as kampong sites. The Scheme provides for the development of successive areas of bendang known as Stages I to V.

Construction work by the Drainage and Irrigation Department is, generally speaking, completed in Stages I, II and III, and in 1939 that Department's efforts were concentrated on Stages IV and the new permanent Headworks.

The latter when completed will consist of a single radial steel gate 4 ft. x 77 ft. 6 ins. counterbalanced for ease of operation, five circular skimming weirs also counterbalanced, which regulate the supply of water entering the two main taliayers, and a three-span concrete arched rib bridge carrying the road over the river.

The cast steel roller bearings on which the bridge spans seat were manufactured in Australia, and the steel gate skimming weirs and all operating gear are being supplied by the Government Factory in Kuala Lumpur.

Progress during 1939.

The history of the Sungei Manik Irrigation Scheme during 1939 may be divided into two clearly defined periods, the former in which development continued steadily in accordance with the previous policy of *"festina lente,"* the latter in which, owing to the outbreak of hostilities in Europe, an attempt was made to accelerate the rate of development in order that, in the words of the British Resident, "we might render ourselves a little less dependent on other countries for our food." This involved a radical alteration in the outlook of both the District Office and the Drainage and Irrigation Department.

At the beginning of the year the omens for the older established areas were propitious. The amount of planted acreage showed an increase of 1,405 acres over that in the 1937-8 season; almost all the available land in Stages I and II was held on permanent title or occupied on T.O.L.*; applications were being received for land in Stage III, the failure to colonize which had been one of the chief disappointments in 1938; damage to the bendangs from rats and birds was appreciably less; there had been no flooding during the previous December except in part of Bendang Kroh; prospects for the harvest were excellent.

* Temporary Occupation License.

This early promise was fulfilled. The harvest, which was reaped during February and the first fortnight in March, proved to be as encouraging as its predecessor had been disappointing. The yields for Stages I and II averaged 300 and 163 gantangs per acre respectively, increases of over 100 per cent. over the corresponding figures (142 and 80 gantangs per acre) for the previous season. Bendang Lama Kanan yielded at the average rate of 400 gantangs per acre and even in the flooded portions of Bendang Kroh practically no damage was suffered as the ears were not immersed and the water level fell again very rapidly. For the first time in the history of the Scheme there was a substantial exportable surplus of padi from Stages I and II. This excess of production over domestic requirements marked an important step towards the fulfilment of one of the objects of the Scheme, which is the supply of rice for external sale. In considering these figures for Stages I and II it must be remembered that although they are the oldest areas of Sungei Manik they are still in fact young areas as padi land and have not by any means reached their full productive capacity.

Between January, 1939, and the end of the 1939-40 planting season a further 1,073 acres in Stages I and II were brought under cultivation, the increase being particularly noticeable in Bendang Kroh and in all parts of Stage II, where many lots, which had only been half cleared and stumped the previous year, were fully cultivated. Meanwhile the area planted in drainage reserves increased from 141 to 192 acres, and approximately 438 acres of land in Stages I and II, notably the area formerly known as Kampong Kroh and certain low-lying lots in Kampong Tukang Sidin, were made available for bendang and were occupied on T.O.L.

The most satisfactory achievement, however, was the colonization of Stage III (Bendang Lampam). Vain attempts had been made to colonize this area in 1938 and there would appear to be little reason to suppose that the attempt in 1939 would have been any more successful but for the drastic reduction in T.O.L. fees at the beginning of the year, when the following scale for land entirely covered by jungle on first occupation was approved by the British Resident:—

			per acre
(a)	during first year of occupation	—	10 cents.
(b)	,, second ,, ,, ,,	—	20 ,,
(c)	,, third ,, ,, ,,	—	50 ,,
(d)	,, fourth and subsequent years of occupation	—	$ 1

In previous reports emphasis has been laid on the extreme poverty of the greater number of colonists at the time of their arrival in the bendang and on the fact that almost all are compelled to seek a livelihood at the same time as they are felling the jungle on their newly-occupied lots. The wisdom of the reduction in fees was not long in doubt. By the end of February 165 men had gone into occupation of a block of land in Stage III; a month later 80 more men had joined them and by the beginning of the planting season the whole area of 1,611 acres had been given out, and *tebang* and *tebas* had made rapid progress.

SUNGEI MANIK IRRIGATION AREA

ORIGINAL PLAN PREPARED BY HEAD QUARTERS
DRAINAGE & IRRIGATION DEPARTMENT.

At a meeting of the Lower Perak Irrigation Areas Advisory Committee it was recommended that water should be withheld from Stage III during the first year of occupation in order that colonists might concentrate on clearing and burning as much as possible. It is estimated that 967 acres were cultivated with dry padi and catch-crops before the end of the year. So keen did the demand for land become that 15 high lots which had formerly been withheld from alienation were given out on T.O.L. for bendang on the understanding that it might not be possible to irrigate them. In case colonists should be reluctant to construct bunds before the boundaries of their lots had been demarcated the British Resident approved that a design survey should be made and work in the field started soon after the end of the year. Survey fees will be collected when permanent titles are issued to T.O.L. holders who have satisfactorily cultivated their lots.

Applications for land in Stage IV were received immediately after the harvest, and before the end of September over 600 men had been put into occupation of the south-western portion of the area, which had recently been protected from all normal flooding from the Kinta River by the partial construction of a perimeter bund. Progress, however, was more apparent than real as very little clearing was done. This was due largely to the lack of accessibility to Stage IV which prevented colonists adopting the practice of clearing their lots while in the same period doing paid work elsewhere.

The need for adequate lines of communication in schemes of this nature is obvious and His Excellency the High Commissioner, in his comments has minuted that "we must provide adequate amenities if we are to get contented colonists.' A sum of $100,000 for a first class road from the Teluk Anson-Kampar Road (38th mile) to the Headworks and beyond and for other roads within the area was entered in the 1940 Estimates; subsequently the British Resident approved that money for the earthwork of the road should be made available in 1939 to conform with the programme of work for the Drainage and Irrigation Engineer's excavating machine. By the end of November the road formation to the east of the Headworks had been completed and work on the other side of the Batang Padang River had commenced. Meanwhile construction work continued in Stage IV and at the end of August 11½ miles of perimeter bund had been completed, although work within the area itself had not started. It was hoped that the building of the Headworks on the Batang Padang River about ¼ mile upstream from the Colonization Officer's house at Sungei Rambai and its connexion with the existing distribution system would have been completed before the end of August, but difficulty was experienced in putting down the foundations and obtaining materials, and the main contract had not been completed at the end of the year. It is now expected that the structure will be completed early in 1940.

Teluk Anson Rice Mill.

For more than two years the question of the erection of a rice mill had been kept continuously in the forefront of the discussions of the Lower Perak Irrigation Areas Advisory Committee. In April, 1939, the question assumed a fresh and

urgent importance in view of the decision of Government that padi should be stored in Teluk Anson for use during the period of relief in an emergency. A 14-acre site next to the new Malay School, Teluk Anson, and with frontage on the Bidor River was acquired at a cost of $27,835 and an order was placed immediately for the necessary machinery and materials for a mill.

The Mill itself is now completed and has been operating since January. Three permanent godowns are also finished and are fully loaded with padi bought on Defence Account. A fourth godown has been erected to take this year's Sungei Manik crop.

Two drying fields 350 ft. x 180 ft. have also been completed. The complete scheme comprises various necessary ancillary buildings, roads, light railways, and a wharf for lighters. Permanent quarters have been completed to house the staff, mill hands and labour force.

The Mill has an output of 18 bags of white rice per hour, and of course simultaneously produces valuable by-products. The latter are much in demand as poultry and cattle food.

A Padi Buying Agency has until this year operated within the area and successfully kept the price from falling to the very low levels offered by Chinese middlemen. In 1940 the Government policy of offering at the new Rice Mill 10 cents per gantang or $2.50 per picul for good dry padi has, for possibly the first time in Malayan history, given padi growers a definite economic opportunity.

At first this policy was not fully appreciated but subsequent meetings and notices have brought a realization of all that it means, and padi is now flowing into the Mill which has already bought 250,000 gantangs of this season's crop.

Land Alienation.

The total area of bendang land alienated and occupied under T.O.L. in Stages I, II and III at the end of 1939 was 10,005 acres as compared with 7,961 acres at the end of 1938. Apart from the colonization of the whole of Stage III (1,611 acres) this represents an increase of approximately 438 acres in Stages 1 and II. Approximately 5,240 acres in these two Stages were held on permanent title. The planted acreage increased from 5,977 at the end of 1938 to 8,068 acres, including 967 acres of dry padi in Stage III and 192 acres planted on drainage reserves, at the end of 1939. Prizes amounting to $60 were awarded to the owners of three lots each in Stages I and II who had most satisfactorily cultivated their bendangs and to the three T.O.L. holders in Stage III who had shown the most persistent industry in felling and stumping their lots. The British Resident approved a recommendation that the sum voted for these prizes should be increased to $200 in 1940.

One lot of approximately 6 acres in Stage III was surveyed and reserved for the use of the Agricultural Officer for the purpose of a Padi Test Station. A block of approximately 20 acres on the south of the second access reserve on the west side of the main canal beyond the Headworks was also surveyed and reserved for the use of the Agricultural Officer for the purpose of an Agricultural Station.

Sites were earmarked for mosques at Permatang Sekolah and Chikus and for a school and a burial ground in Stage III.

A water-rate was imposed at $2 per annum with effect from the 1st January, 1939, on an area of approximately 2,821 acres which was receiving irrigation water for the fourth year; half rate was collected during 1939. Towards the end of the year the British Resident approved a recommendation of the Lower Perak Irrigation Areas Advisory Committee that water rate should not be imposed on any further areas in 1940, for, although the whole of Stage II will then be receiving irrigation water for the fourth year, the supply of water has not been entirely satisfactory during the previous 3 years. This was due primarily to the fact that the permanent Headworks were not in operation.

Education.

Two schools already exist within the area. These are to be extended this year to provide for the large number of children on the waiting list and a third school will also be erected in 1940 to deal with Stage III requirements.

Railways.

Figures compiled by the Railway Department show that 11,268 passengers were booked from Sungei Manik Station during the course of the year. Traffic was particularly heavy during the harvesting months and towards the end of the year.

Medical and Health.

The Medical and Health Services supplied in the Irrigation Area are constantly reviewed and demands met as far as possible. During 1939 1,231 cases were treated of whom 114 were found to be suffering from various types of fever.

It has been decided that the reservation of sites for an Infant Welfare Centre and a dispensary should be postponed as it is not yet possible to foresee sufficiently clearly the trend of development in the kampong area beyond the Headworks or to decide whether sites in this area or in the embryonic village of Chikus would be more suitable.

Village Development at Chikus.

The survey of 22 shop-lots on a block of State land near the Penghulu's house was completed and action was taken to gazette the area as a village under Section 6 of the Land Code (Cap. 138). Subsequently these lots will be alienated by public auction and the type of buildings to be erected will be controlled by an express condition endorsed on each title.

Advisory Committee.

The Advisory Committee met eight times during the course of the year. From January to May it met at monthly intervals and thereafter once in two months.

Co-operation.

There are three Seasonal Co-operative Credit Societies in the Irrigation Area; of these two are registered. These societies are intended to help their members with small loans, payable at harvest, to enable them to tide over the lean period between harvests, and so to avoid the ruinous practice of forward sale of padi which is so common in other bendang areas.

Development Subsequent to Outbreak of Hostilities.

Although during the first eight months of 1939 the development of the Sungei Manik Scheme proceeded in accordance with the principle "too swift arrives as tardy as too slow," progress had, in fact, been considerably more rapid than during the corresponding period in 1938. It was not, however, rapid enough to suit the changed conditions of war time. Within a few days of the outbreak of war His Excellency the High Commissioner emphasized the importance of making the country much more nearly self-supporting by increasing the area under padi in the Peninsula as early as possible, and the Perak Government announced its intention of trying to bring the whole of Stage IV (9,000 acres) under cultivation with wet padi before the beginning of the 1940-1 planting season.

The magnitude of the task will be appreciated. It is unreasonable to expect Peninsula Malays at the present time to cut all their ties with the kampongs in which they were born and where they have lived all their lives and to migrate in large numbers to Sungei Manik unless amenities are offered.

The new proposals aimed at the cultivation within one year of 9,000 acres of remote jungle situated between the Sungei Kroh and the Sungei Lampam, an area not served by any road or bridle-path and to which the only possible means of access from Teluk Anson were by way of the Perak River and its tributaries or along the perimeter bund recently erected by the Drainage and Irrigation Department, and not yet compacted or surfaced to form an access path.

It was obvious that exceptional methods must be adopted if the scheme were not to be strangled at birth. The Drainage and Irrigation Engineer was authorized to press on at full speed with all the work he could possibly undertake and his Department embarked on a rapidly accelerated programme involving the felling of 205 acres of jungle (completed in 1939) and the task of excavating 564,000 cubic yards for necessary earthworks and the construction of all necessary concrete controls. Contracts were given for various necessary constructional works and tenders called for the main drainage outlet of Stage IV. This control, which was designed by the Drainage and Irrigation Department, is of advanced type and embodies three self-priming syphon spillways, each one set to come into operation at a slightly different level, thus automatically maintaining the water level at a predetermined level in the area served by the control. Plans are also in hand for the various other reinforced concrete structures required to complete the distribution system.

In the meantime it was decided that, as existing methods of colonization would not be capable of bringing the whole of Stage IV under cultivation within the required period, the work of felling and burning the area should be accomplished

under the supervision of an experienced European planter by a large labour force of Malays, who would live in temporary "kongsi" houses in the area and continue to work as labourers until the whole area had been cleared and burnt, when those who had worked well could have first claim to 5 to 6 acres each of felled land for padi growing.

The proposals of the Perak Government are given below:

1. In pursuance of the Government's policy of encouraging the planting of further areas of padi, the Perak Government is prepared to offer employment to 4,000 Malays in felling and burning jungle on Stages IV and V of the Sungei Manik Irrigation Area.

2. Malays so employed will be provided with temporary housing and will be paid 50 cents a day for each day they work. Arrangements will be made for the supply of rice and other food-stuffs at moderate rates, should that be desired.

3. Those Malays who work well will have first claim to be allotted 5 to 6 acres of felled land for padi growing and will also be given about 1 acre of kampong land. This land will at first be held under temporary occupation licence but after 3 years, provided it has been satisfactorily cultivated, a permanent title will be given.

4. A bonus of $10 per acre will be paid to all holders who have completely cleared and stumped their lands within 12 months of entering into occupation. In the case of Stage III a similar bonus will be paid in respect of land cleared and stumped in time for the 1940 planting season.

5. The present programme provides for irrigation water on Stage IV in 1940 and on Stage V in 1941.

6. The rice mill at Teluk Anson will undertake to purchase any surplus padi at favourable rates.

7. Any Malays anxious to avail themselves of this offer should apply to their local District Officer, who, if satisfied as to their suitability, is authorized to provide them with a ticket warrant for their journey to Teluk Anson.

It was realized at the outset that Malay small-holders could not be moved about like storm troopers and that the recruitment of a large labour force at Stage IV would present considerable difficulties. Not only was the Puasa month about to begin, but the dry season, in which Malay settlers are accustomed to do the whole of their jungle work, was coming to a close. Moreover, with the price and release of rubber beginning to soar, there was little economic distress in the kampongs to stir the "frog from under his coconut shell" and compel him to seek a livelihood elsewhere, and particularly to stir him to an area as remote and as difficult of access as Stage IV. A gang of Malays from Kampong Gajah sent in as pioneers during the Puasa month promptly disintegrated as conditions of living were too severe. Steps were immediately taken to improve conditions and a village, complete with "kongsi" houses, shop, dispensary, mosque, wells and latrines, was constructed before the next band of labourers was sent up shortly after the end of Bulan Puasa. At the same time action was taken to improve the access to the area by levelling the perimeter bund, constructing a rough road with

a sanded surface from the Sungei Kroh to the village, and making a bridle-path from the end of Distributary 13 in Bendang Kroh to the perimeter bund at the south-east side of Stage IV.

After the Hari Raya Puasa (16th November) small parties of men began to arrive in the area almost daily, and, although there were constant disappointments in the shape of defections or of men failing to appear at the time promised, there were 1,147 men at work by the end of the year and about 1,500 acres of *tebas* and 200 acres of *tebang* had been completed. During the month of December a second village was constructed on the southern side of the perimeter bund and arrangements made to bring in approximately 500 more men during the first fortnight in January. The position steadily improved during the first 3 months of this year and there are now over 2,000 labourers within the area.

Conclusion.

It is interesting to consider to what extent the policy of felling, burning and colonizing Stage IV before the beginning of the 1940-1 planting season will be successful. This clearing scheme is, I believe, larger (for the time allowed) than any similar scheme attempted in Malaya by even the planting industry. It is certainly the first time such a vast scheme has been attempted by Malay labour. It has already been established that Stage IV should not be irrigated in 1940. It is preferable that settlers should be able thoroughly to clear their land of stumps and logs, and plant dry padi and catch crops, before irrigation water is supplied, as otherwise these stumps and logs become water-logged and take years to disintegrate.

In January, 1940, although the major result of our efforts appeared to be merely the creation of two large villages occupied by labourers, many of whom were callow youths contemptuous of discipline and impatient of hard work, the position was not so evil as it appeared to be.

The organization was coming to grips with the work involved, the numbers of labourers were about to mount, and there existed a core of family men mainly from the District of Krian and Pasir Panjang Ulu in this District, whose numbers were shortly to be augmented by many others of a similar type from Penang and Province Wellesley, who were anxious to settle on the land and were determined to achieve their object as early as possible.

The rate of felling is now in the region of 1,500 acres per month and unless some hitherto unforeseen deterrent factor of major proportion arises we should, later in this year, see foodstuffs growing on an area of 9,000 acres where jungle reigned until 1940.

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Glossary.

Bendang	=	padi field.
Kampong	=	village or homestead.
Tali-ayer	=	irrigation water-way.
Gantang	=	gallon.
Tebang	=	clearing of heavy jungle.
Tebas	=	clearing of light jungle.
Kongsi house	=	communal dwelling place.

QUARTERLY REPORT ON THE MALAYAN PINEAPPLE CANNING INDUSTRY.

March to May 1940.

Prepared by the Economics Branch of the Department of Agriculture, S.S. and F.M.S. from Reports of Field Officers.

Factories.

There are 20 registered factories in Malaya, including four peeling sheds, twelve of which are in Johore, five in Singapore and three in Selangor.

In Johore, three factories operated during May, but workers adopted a "go slow" order of their Society and production was seriously curtailed by this action. In Singapore one factory worked intermittently throughout the quarter. On the 23rd May, up to which date the remaining four factories had been working, the cutters decided to cut down production to approximately one-third of the normal, and on 28th May they ceased work and no further work was done for the remainder of the quarter. Of the Selangor factories, one was in operation throughout the quarter. The second factory was used as a cutting factory to supply the fruit, while the third factory was closed throughout the quarter.

Normal inspections of factories were carried out during the quarter. As a result, the registration and mark of one factory in Johore which were cancelled in the previous quarter were renewed. Orders were given by the Health Authorities to one factory in Singapore to provide additional accommodation for the labourers.

Prices.

The prices of canned pineapples remained unchanged; they were as follows, per case of 48 cans of 1½ lbs. each.

	General Average Quality (G.A.Q.)	Golden
	$	$
Sliced Flat	4.80	5.40
Sliced Tall	4.95	5.55
Cubes	4.85	5.45

In Johore prices paid in the field followed closely those agreed upon by the Central Board. These prices are now generally well known to growers as their Association has given considerable publicity to the prices payable for fruit. Cases were reported where factories, although paying the prices laid down by the Central Board, were not paying for full quantity of fruit delivered, thereby actually buying at lower rates.

At a meeting of the Central Board held on 30th April the fruit prices payable at factories were increased as from 11th May, and are now as follows:—

Class of Fruit	Average Weight of 100 Fruit	Price for every 100 Fruit less than Half-Ripe			Premium for every 100 Fruit at least Half-Ripe
		Johore and Klang	Singapore		
			Kranji	Serangoon Grove Road	
	lbs.	$	$	$	cents
Under 1½ lbs. ...	125	0.58	0.63	0.66	nil
1½ lbs. to 2½ lbs. ...	200	1.09	1.21	1.26	10
2½ lb. to 3½ lbs. ...	300	1.64	1.81	1.89	20
Over 3½ lbs. ...	400	2.20	2.42	2.53	40

Production and Sales.

The quota fixed by the Central Board for the season April to September was 1,400,000 cases, subject to the proviso that all packing would cease if the Board should have accumulated an unsold stock of 300,000 cases. Of this total quota 700,200 cases were allotted for packing in April and May.

Exports of Malayan canned pineapples for the three months subsequent to the last quarterly report were as follows:—February 4,031 tons, March 3,036 tons, April 4,252 tons.

All imports of canned pineapple into the United Kingdom are now made through the Ministry of Food, and a Singapore firm has been appointed to handle all exports on behalf of the Ministry. All existing contracts were taken over by the Ministry early in May.

Government Research Station and Canning Factory.

Considerable work was carried out to perfect the system of examination under the Malayan Mark Scheme, and to draw up a scale of exact definitions of quality in order to standardize as much as possible the Malayan Mark grading. Many samples of "Golden" and "Standard" grade packs were taken from the operating factories and examined on the Malayan Mark basis; full reports were submitted to the canners and visits were made to the factories to discuss the reports with a view to correcting faults in the packs. It was decided that, until the adoption of the Malayan Mark Scheme by the canners, at least two samples should be taken for examination every month from each operating factory; reports are submitted and the results discussed with the canners. It is hoped that by this means, the standard of quality will be gradually raised until it will not be difficult for the canners to turn over to full scale Malayan Mark production; it will also familiarize them with the working of the scheme before it is actually brought into force.

Canning trials were carried out to demonstrate the improvement in the colour of canned pineapples due to the exhaust process as compared with the methods at present employed in many factories of closing the cans cold. The colour improvement was greatest with fruit of pale yellow and yellow colour which would normally be packed as " Standard Grade." With the exhaust process much of this fruit which would normally be regarded as " Standard " grade would qualify as " Golden."

Very satisfactory results have been obtained with liquid rubber compound for spraying into the lids of cans to make an airtight joint when the can is closed. At present locally made rubber rings are used but these are not satisfactory and many complaints are received of particles of rubber inside cans. The rubber compound used was obtained from America but samples have now been produced locally by the Rubber Research Institute and have given promising results; the work is being continued.

Complaints have been received periodically of cans being delivered in England with one or both ends bulged out; these are known as " flippers " and although the contents are not in any way spoilt they are not acceptable to the trade. It is known that the use of the exhaust process will eliminate this trouble, and careful investigations of all the causes of "flippers" were commenced in order to find what immediate action could be taken to minimize the trouble until such time as all the factories are equipped with the exhaust process.

General.

There were further labour troubles during the quarter under review, and as the crop was unexpectedly high growers lost considerably as the result of the reduced working of factories.

Abstract.

THESE VERSATILE FATS AND OILS.

The following is an abstract of an address under the above title delivered by Mr. C. E. Lund, Fats and Oils Section, Foodstuffs Division, Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D.C. on 10th May, 1939, before the 43rd Annual Convention of the National Cottonseed Products Association, New Orleans, Louisiana, and brought to our notice by Mr. G. S. Reis, B.Sc. (Agric.), J.P.

The address is of particular interest in view of the remarks which are offered on the subject of American self-sufficiency in the matter of fats and oils.

The present annual consumption of fats and oils in the United States, of which lard and butter constitute from 40 to 45 per cent., has risen from 5 billion lbs. some 25 years ago to over 9 billion lbs. at the present time. When consumption was only 5 billion lbs. there were net exports of some 600 million lbs., but in 1938 with a consumption of 9 billion lbs. the net imports were 1½ billion lbs. The fats and oils imported are those used principally in soap, paints and varnishes, linoleum, lubricants and medicines.

Details of the sources, trade and commercial uses of the world's more important oils and fats, commencing with some of the newer ones to enter the United States market, are given. In this connexion attention is drawn to the almost unlimited supplies of oil-bearing materials from Brazil. Among the newer oils from this country may be mentioned babassu nuts, of which some 25,000 tons were imported during 1938. The babassu nut yields an oil similar to coconut oil. A reference is also made to oiticica oil, the nearest known vegetable counterpart to tung oil.

Coming to the leading oil-bearing material exports of the world in order of importance, *i.e.* soya beans, linseed, groundnuts and copra, the following facts are of interest. The United States is the third largest producer of soya beans, following China and Manchuria in that order. Soya bean oil is becoming of increasing importance in the United States, particularly in the edible oil industry, the lard shortage in recent years increasing its use in the shortening and margarine industries. The disposal of the cake and meal is becoming something of a problem.

Argentina is far in the lead among linseed-producing countries. Exports in 1937 amounted to over 1,800,000 tons, of which more than 600,000 tons were shipped to the United States. United States also ranks fourth in world production of linseed, following Argentina, Soviet Union and British India. Increased building activities in the past five years in the States have greatly increased the use of paint oils, and linseed supplies about 60 per cent. of the annual consumption of all oils used in the paint and varnish industry. The United States ranks first among exporting countries for linseed cake and meal.

With regard to groundnuts it is interesting to note that the bulk of the harvested crop in the United States is used as nuts. Government payments for the diversion of surplus groundnuts from other channels to crushing for oil expression have, however, greatly stimulated domestic groundnut oil production in the past few years.

Coconut oil and the oil equivalent of imported copra are the heaviest imports of the United States in the field of vegetable oils and fats, amounting to as much as 36 per cent. of all imports in this group in 1938. The United States derives practically its entire supplies from the Philippines. The principal use of coconut oil is in the manufacture of soap, where it follows tallow as a leading ingredient. In 1938 the soap industry absorbed two-thirds of the coconut oil consumed in factory operations, the remainder going into edible products, of which 15 per cent. entered shortening, 50 per cent. margarine and 35 per cent. other edible products, including fancy crackers, candies and other confectionery.

Palm oil is the United States' third heaviest import in the oils and fats group following coconut oil (including the oil yield of copra) and linseed reduced to its oil equivalent. Supplies are obtained principally from Netherlands Indies and Belgian Congo; in 1937 these amounted to over 180,000 tons. Palm oil is the leading source of hard, slow-lathering soap material. Textile manufacturers use large quantities of palm oil soaps, claiming that no other soap is suitable for the purpose. In 1938 the factory consumption of palm oil was about 45 per cent. each in shortening and soap and 10 per cent. in miscellaneous products, the largest of which is tin plating.

Europe is practically the only market for palm kernels, the United States taking only about 20,000 of the 600,000 tons annual world imports. The United States is usually the largest importer of palm kernel oil which is used for the same purposes as coconut oil.

In regard to cottonseed the United States is by far the world's largest producer, the amount in 1937-38 being in excess of 7,500,000 tons. Practically the entire domestic crop of cotton seed is consumed within the country. In recent years, commencing with 1935, the United States has again become the largest importer of cottonseed oil. Imports in 1937 amounted to over 86,000 tons. The marked increase in imports has been due chiefly to shortage of domestic supplies of lard and the increased production of vegetable fat shortenings. Estimated on the basis of the cottonseed produced in the world the cake and meal production would be about 6,000,000 short tons. Of this total less than 10 per cent. enters international trade, producing countries for the most part use cake or meal as a feeding stuff or fertilizer.

Cottonseed produces one of the finest edible oils. More than 90 per cent. of factory consumption is for edible products, particularly for shortening.

In the manufacture of margarine cottonseed oil has displaced coconut oil in the United States as the leading vegetable oil since 1937.

The principal nations of Europe are on a deficit basis for fats and oils and an important factor in the desire of several of these nations for colonial possessions is to obtain access to the rich supplies of oil seeds in Africa and Asia. Large quantities of these raw materials are brought to the crushing centres of Europe, where the oil supplies domestic needs and the rest is shipped abroad. Much of the

resultant oilcake and meal is retained at home to augment insufficient domestic supplies of livestock feed. Naturally, the bulk of these oil seed imports are usually taken from colonial possessions, receiving preferred tariff treatment in the mother country.

The United States is a far larger consumer of fats and oils than any of these European countries. The recent calculation by the Imperial Economic Committee in London compared our 2,000,000 tons consumption of vegetable oils in 1937 with Germany's 719,000 tons, the United Kingdom's 652,000 tons, France's 575,000 tons and Italy's 533,000 tons. In addition, the United States is far in the lead of any other country in the production and consumption of lard, butter, and vegetable fat shortening and follows Germany and England in margarine output.

Attention is drawn to the efforts of Germany to become self-sufficient in regard to the supply of fats and oils. Some 15 years ago American exports of lard to Germany averaged 150,000 tons; now these have practically disappeared, principally on account of exchange and barter requirements, increased imports of vegetable oils and oil seeds from other countries, and a much wider use of whale oil. The development of a German whaling fleet together with the much wider use of whale oil in the margarine and edible fat industries provided a real windfall for the currency authorities dealing with supplies of oil seeds for German millers since it enabled foreign exchange formerly paid to Norway for charter of whalers and whale oil to be used for the purchase of additional oil seeds.

Among other attempts made to increase supplies of fats and oils, principally for use in soap, may be mentioned collection by children of beech nuts from the forests, the installation of grease traps in drainage pipes from large institutions, particularly hotels and restaurants, and the collection of all coffee grounds for solvent extraction. As regards saving fats, the German cleanser industry has developed a number of chemical compounds containing alkalies with very little fat which can be used as soap substitutes. The total saving of fats by the use of such washing powders has been estimated at about 100,000 tons annually. Similarly, the German dye, paint, and varnish industries have been endeavouring to develop paints and varnishes without a vegetable oil, while the German fermentation industry has been experimenting on the production of an edible fat from milk fungus. Necessity is truly the mother of invention.

With regard to the United States, self-sufficiency in fats and oils could be achieved if that were considered a desirable goal. No other nation in the world is in a more fortunate situation as regards food supplies than the States with its bounteous and diversified soil and climate. With the exception of certain tropical palms, all the important oil seeds can be produced on a commercial scale. There is also no question about self-sufficiency of the States in regard to edible oils such as butter, lard, cottonseed and corn oils, and hog numbers in the southern States could be readily and substantially increased.

Crushing the oil from an increased oil seed production would provide employment for many additional workers. By raising more hogs, which are a leading medium for converting a considerable proportion of the crops of the nation's farm-

ers into something of value, the augmented oilseed crop would produce a surplus over edible needs to supply some of the inedible vegetable oil requirements.

The other side of the picture is that, when grown as oil seeds both soya beans and groundnuts are classified as soil depleting crops and millions of acres of farm land in the States have already been damaged through soil erosion and lack of application of the principles of the maintenance of soil fertility. By eliminating imports the export market for the normal lard surplus would be further reduced and the oils and fats formerly reaching the country would have to seek an outlet elsewhere. Those that could be used for competitive shortening and margarine would run into a lower priced market abroad on account of this constriction in markets, and the lessened need for lard would reduce its value to a point where it would not be feasible to export.

In addition, the increased amounts of oil cake and meal resulting from an expanded oil seed crop would not find the market existing in Europe before import barriers became the style in attempts at national self-sufficiency. The sale of domestic oil cakes would indeed become a problem.

As regards inedible vegetable oils it would be necessary to increase greatly the acreage under linseed, to cultivate castor beans and to produce nearly forty times as much domestic tung oil as at present, or use synthetic substitutes or a less satisfactory oil for varnish.

The answer seems to be a diversification of crops, planting those oil seeds adaptable to the soil and climate of the States and which prove profitable to grow for domestic use, meanwhile importing for industrial use those that can be grown more profitably elsewhere; then increase export markets for those products which can be sold to nations on a reciprocity basis. History shows that the nations that have prospered are nations that have engaged in foreign trade.

C. D. V. G.

Reviews.

Plant Hormones and their Practical Importance in Horticulture.

By H. L. Pearse (Forword by Professor F. G. Gregory) Technical Communication 12 of the Imperial Bureau of Horticulture and Plantation Crops, East Malling, Kent, England, 1939, pp. 88, bibl. 248, price three shillings and six pence.

Since the possibility of inducing root formation on a cutting by treatment with a plant hormone was first demonstrated some ten years ago, much information on this subject, and on other effects of plant hormones or their synthetic substitutes on plant growth has accumulated. Reviews of the literature summarizing this information have been published in the past but these reviews were written primarily for the benefit of the academic research worker and dealt more with the purely scientific than with the practical aspects of the subject. The present publication aims at focussing attention on results of practical importance and presenting information of value to those interested in the use of plant hormones in horticulture.

The author deals with the subject under two main sections. The first and larger is entitled "The Use of Plant Hormones in Vegetative Propagation"—a misleading title since the information presented relates entirely to propagation by cuttings—while the second concerns "Other Effects of Horticultural Importance". In the latter section the effects of plant hormone treatment on seed germination, plant growth generally, fruit development, fruit storage, framework control in fruit trees and rooting of transplanted nursery trees is discussed. The information available on these aspects of the subject is relatively meagre and the impression gained from a study of this section is that much additional careful investigation is necessary before recommendations can be made for practical use.

The discussion on the use of plant hormones in the rooting of cuttings is introduced by a consideration of the factors other than hormone which condition root production in cuttings. This is followed by an historical review of the discovery of the root-forming hormone and its synthetic substitutes. The author then presents a brief but excellent review of the literature on the practical use of synthetic hormones in the rooting of cuttings and the section concludes with some practical suggestions for the assistance of the propagator and a discussion of the mechanism of induced root-formation. The value of the mass of practical information contained in this section is considerably enhanced by the "Index of some Typical Results Obtained with Various Species" which occupies some 35 pages of the memorandum. The index is in tabular form and the information is compiled from the published results of numerous investigators and concerns the response of cuttings of nearly 400 species or varieties of species to treatment with root-forming hormones. The index forms a valuable guide to the practical use of root growth-promoting substances and incidentally furnishes the most convincing evidence of the value of these substances in the rooting of cuttings. Analysis of the information presented shows

that in 72 per cent. of the species, treatment with root growth-promoting substances was beneficial in increasing the percentage of cuttings which rooted, in 25 per cent. treatment had no effect, while in 3 per cent. treatment was detrimental.

Dr. Pearse is to be congratulated on the successful accomplishment of a difficult task and to him and to the Imperial Bureau of Horticulture and Plantation Crops the horticultural community is indebted for an extremely useful and informative publication.

T. W. B.

Vegetative Propagation of Tropical and Sub-tropical Plantation Crops.

By G. St. Clair Feilden and R. J. Garner. Technical Communication 13 of the Imperial Bureau of Horticulture and Plantation Crops, East Malling, Kent, England, 1940, pp. 99, price three shillings and six pence.

When in 1936 the Imperial Bureau of Fruit Production issued a technical communication dealing with the vegetative propagation of some 100 fruit varieties grown in the tropics and sub-tropics, it was not without misgivings as to the number of persons likely to be interested.

That such fears were unwarranted was quickly shown by the demand on issue. This was immediate and so considerable as to necessitate the reproduction of the publication in the following year.

The present work by the renamed Bureau, which deals, appropriately enough, with the vegetative propagation of some 55 plantation crops, should form a useful companion volume.

The help of technical experts has been invoked for adequate treatment of such major crops as rubber, coffee, cacao, while the foreign literature has been thoroughly combed for details of propagation of the less familiar, but nevertheless important, crops.

One feature of the previous work which commended it also to workers in temperate regions is retained and considerably enlarged. That is the section devoted to methods used in vegetative propagation. The descriptions there are supported by simple, clear, line drawings of some seventeen types of graft and seven types of budding commonly used in vegetative propagation.

In addition tropical workers will be glad of the account and illustrated detail of the construction of loosely woven potting baskets which have been found so useful a substitute for pots in nursery work in the tropics.

For those who wish to study originals a list of references immediately follows the discussion on the propagation of each particular crop.

Departmental.

FROM THE DISTRICTS.

Compiled in the Office of the Chief Field Officer from Monthly Reports of Agricultural Officers.

June, 1940.

The Weather.

The long dry season commenced during June, and while normal rainfall was generally recorded, the second half of the month was very dry in most parts of the Peninsula.

On the east coast, in Kelantan rainfall was up to, or slightly in excess of, the average for the month, but distribution was not good, and following a long dry period the effect on the land generally fell short of requirements. In Pahang, while Raub and Jerantut were dry, rainfall at Kuala Lipis exceeded normal and fairly wet conditions existed in South and East Pahang, the rainfall at Pekan being very heavy.

Crop Reports.

Rubber.—The market fluctuated during the month and good quality smoked sheet varied from $40 to $48 per picul. Uncouponed rubber was sold at $16 to $21 per picul, but in South Pahang it was quoted as low as $11 to $13.50. The value of coupons also varied considerably, the general range being from $20 to $28.50 per picul equivalent. In Kuala Lipis they fetched $30, and $33.50 in Pontian where rumours of the cessation of their issue led to the sharp rise in value.

In Kelantan steady progress is reported with the construction of smoke-houses; 97 are completed, 21 under construction, and 40 projected.

Two new smoke-houses were erected in East Pahang making a total of 90 in Kuantan and 80 in Pekan; 60 per cent. of the cabinets were in regular use.

A Singapore rubber broker's report has been obtained on samples of smallholders' rubber from Brunei. No. 1 grade was only slightly inferior to standard sheet, and was valued at the price of Chinese Prime less 1/8 cent per lb. No. 2 and No. 3 qualities were reported to be equal to Good F.A.Q. and Fair F.A.Q. respectively.

Padi.—In Sungei Acheh, Province Wellesley, heavy rain on the 15th and 26th June saved the situation just as the padi fields were becoming dangerously dry, but the prospects are not bright with July dry weather ahead.

The Krian 1939-40 crop was 16,972,000 gantangs, giving an average yield of 331 gantangs per acre. The crop figure is an increase of 8 per cent. over the previous season. From the beginning of the season until 24th June 305,550 piculs of the Krian crop had been bought by the Government Rice Mills, of which 251,550 piculs (82 per cent.) were S.K. 48.

Planting in Krian for the 1940-41 season will be late owing to delay in water supply due to necessary repairs being carried out to a culvert.

In Bruas, Perak, the planting dates are being more closely followed than in previous years, and there is a decided improvement in the bunds in many areas as a direct result of the Department's work in co-operation with the Drainage and Irrigation Department.

The permanent Headworks at Sungei Manik, Perak, were opened by H.H. the Sultan of Perak on 12th June, and the supply of water to Stage I commenced soon afterwards. The supply of water to Stage II has already started and the preparation of nurseries commenced in one area.

In the Lipis District of Pahang the planting season is behind schedule owing to the drought earlier in the year.

In Kelantan early short-term wet padi nurseries are doing well and transplanting has been commenced in a few localities. The cultivation of long-term wet padi nurseries has been commenced generally but sowing has not yet been undertaken.

Harvesting was completed in Brunei during June. It is probable that the average yield will be lower than in the previous season, but the total area under padi was increased by 1,000 acres. The total production of rice is estimated to be rather more than one half the State's annual consumption.

At the recently opened Teluk Anson Government Rice Mill the parboiling plant is now in operation. The efficiency of milling has increased from about 50 bags white rice per day from raw padi to 80 bags from parboiled padi. This performance exceeds the claims made by the mill agents.

By 19th June a total of 10,677 piculs of padi had been purchased, of which 2,465 piculs (23 per cent.) were sealed S.K. 48.

Coconut.—In Bagan Datoh, Perak, the price of small-holders' copra has fallen from $2.60 to $2.70 per picul to $2.13 to $2.20. Inter-planting of coconut areas with tapioca, vegetables and food crops has increased considerably and most drainage and road reserves are also fully planted up.

Fruit.—Heavy crops of fruits have been harvested in the north of the Peninsula, notably of durian, mangosteen, rambutan and chiku.

A demonstration of the method of construction of good nursery beds for fruit trees was given at the Central Mental Hospital, Tanjong Rambutan, so that the propagation of some of the good fruit trees may be facilitated.

Tapioca.—Tapioca is reported to be increasing in popularity as a small-holder's crop in Perak and several Chinese are planting up considerable areas. One Chinese proposes erecting a mill for the extraction of flour when the crop matures and increased pig keeping will be undertaken, with tapioca refuse as the main item in the feeding ration.

Maize.—The planting of maize is widespread in Perak Central, and good crops have been harvested in the Kuala Kangsar District.

Food Crops.—Progress is reported in the cultivation of food crops in new areas in the State of Selangor. In one district 145 acres have been given out for this purpose, and a Malay Agricultural Assistant has delivered lectures on the subject at mosques.

Patchouli.—The price of $22 per picul is proving attractive to patchouli planters in Jerantut, Pahang, and the area under this crop is steadily increasing.

DEPARTMENTAL NOTES.

Leave.

Dr. T. A. Buckley, Chemist, has been granted 150 days leave of absence from 10th June to 6th November inclusive.

Appointments.

Mr. H. T. Pagden, Entomologist, has been appointed to act as Senior Entomologist, Agricultural Department, S.S. & F.M.S., with effect from 17th April, 1940, inclusive.

Mr. V. Dawson, Vice Principal, School of Agriculture, Malaya, has been appointed to act as Principal, School of Agriculture, Malaya, with effect from the 25th May, 1940, inclusive.

FERTILIZER PRICES, JULY, 1940.

The following are the prices current for the month of July, 1940, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20.6	—	—	—	114.00
Calcium Cyanamide ...	20.6	—	—	—	120.00
Muriate of Potash ...	—	—	—	60	150.00
Sulphate of Potash ...	—	—	—	48	not available
Superphosphate (concentrated) ...	—	39	—	—	140.00
Superphosphate ...	—	16-18	—	—	75.00
Basic Slag ...	—	16*	—	—	75.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	37.00 ¶
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total ¶ $35.00 per ton *ex* warehouse, Singapore.

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham Klang and Singapore.

Statistical.

MARKET PRICES.

June, 1940.

Major Crops.

Rubber.—There were again substantial fluctuations in the Singapore market. No. 1. X. Ribbed Smoked Sheet opened at 37⅜ cents per lb. and rose to 39½ cents on the 12th June; it fell to 36¼ on the 20th, made a slight recovery, fell to 36 on the 26th and closed at 36½ cents.

The average of daily quotations for the month was 37.34 cents per lb., as compared with 37.22 cents in May. The London average price was 13 pence, having touched 14¼ pence on the 18th, and New York 21.81 cents gold, as compared with 11.55 pence and 20.78 cents gold in May.

Prices paid for small-holders' rubber at three centres during the month are given in Table 1.

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, July, 1940.

(Dollars per picul of 133 1/3 lbs.)

Grades	Kuala Kangsar, Perak				Kuala Pilah, Negri Sembilan				Batu Pahat, Johore.			
	5	12	19	26	6	13	20	27	5	12	19	26
Smoked Sheet ...	44.99	44.90	44.75	40.66	44.00	—	43.50	—	42.53	43.00	—	—
Unsmoked Sheet ...	42.00	—	41.89	41.40	—	45.00	42.00	42.00	41.00	—	38.70	39.50
Scrap ...	—	—	—	—	33.00	—	—	—	—	—	—	—

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8 per ton.

Transport from Batu Pahat to Singapore by lorry, excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

Palm Oil.—A letter from the Malayan Information Agency dated the 13th May states that the Ministry of Food is buying crude Malayan palm oil in bulk at £17 per ton c.i.f.

In the market report last month it was stated that the import of palm kernels from Malaya to the United Kingdom was now prohibited by the Food Controller. As that statement is open to misinterpretation we should explain that all sales of palm kernels to the United Kingdom are made through the Ministry of Food. This authority is not entering into any further contracts for Malayan kernels but shipment will proceed of existing and uncompleted contracts.

Local sales of palm oil, in sellers' drums, were made during June at the following price: unbleached 5 per cent. f.f.a. $190 per ton f.o.b. Port Swettenham for July delivery.

Copra.—The market continued to fall heavily during June. The sun-dried grade was quoted at $3.40 per picul during the first half of the month but then weakened and closed at $2.90, averaging $3.17 per picul as compared with $3.69 in May. The mixed grade averaged $2.80 per picul as compared with $3.29 in May.

A letter from the Malayan Information Agency dated the 13th May states that the Ministry of Food is buying f.m.s. Straits copra at £13.10 per ton c.i.f.

Coconut oil was sold in June at an average price of $8.50 per picul f.o.b.

Copra cake fell still further from $1.30 to $1.10 averaging $1.18 per picul as compared with $1.40 in May.

Rice.—The Singapore average wholesale prices of rice per picul in June were as follows:—Thai No. 2 Ordinary $4.64, Thai No. 1 Broken (White) $4.22, Thai No. 2 Broken (White) $3.98. There were no dealings in Rangoon No. 1, Rangoon Parboiled No. 2, and Saigon No. 1 (Long Grain).

The April average retail prices per gantang (gallon) of No. 2 Thai rice were: Singapore 29, Penang 29, Malacca, not quoted, as compared with 29, 30½, and not quoted respectively in March.

The average declared trade value of imports during April was $4.32 per picul, as compared with $4.61 in March and $4.59 in February.

Padi.—The Government Rice Mills, Perak, are paying a guaranteed price of $2.50 per picul for padi, plus a bonus of 10 cents per picul for pure strain S.K. 48 padi.

Retail prices of padi per 100 gantangs (gallons) were as follows:—Province Wellesley and Penang $9.80, Perak Central $9.50 to $10, Perak South $9 to $12, Selangor $11 to $15, Negri Sembilan $8 to $12 ($15 to $16 Seremban and coast), Pahang $7 to $13, Johore $14 to $17, Kelantan $10.50 to $10.80.

Pineapples.—There was no change in the prices for the canned product.

Prices for fresh fruit were increased by the Central Board of Pineapple Packers and are now as tabulated below:

Class of Fruit	Average Weight of 100 Fruit	Price for every 100 Fruit less than Half-Ripe			Premium for every 100 Fruit at least Half-Ripe
		Johore and Klang	Singapore		
			Kranji	Serangoon Grove Road	
	lbs.	$	$	$	cents
Under 1½ lbs. ...	125	0.58	0.63	0.66	nil
1½ lbs. to 2½ lbs. ...	200	1.09	1.21	1.26	10
2½ lbs. to 3½ lbs. ...	300	1.64	1.81	1.89	20
Over 3½ lbs. ...	400	2.20	2.42	2.53	40

Beverages.

Tea.—No London prices are available.

The latest Colombo prices available, quoted from *The Ceylon Tea Market Report* of 18th June, 1940, of the Colombo Brokers' Association are as follows, in rupee cents, per lb.: – High Grown 91, Medium Grown 71, Low Grown 58.

Coffee.—Liberian coffee was quoted in Singapore at $17 per picul, Excelsa at $15, and Robusta at $9.50.

The average of highest and lowest quotations in Singapore for Palembang coffee was $14.37 to $17.44 per picul, and for Sourabaya coffee $10.31 to $12.56. The May average prices were $10.20 to $12.20 and $13.15 to $15.30 respectively.

Spices.

Arecanuts.—The averages of the Singapore Chamber of Commerce quotations per picul, which were stated to be approximate, were:—Best $4.52, Medium $3.91, Mixed $3.64.

The averages of the highest and lowest quotations per picul in Singapore were as follows:—Splits $4.25 to $6.63, Red Whole $5.37 to $6.68, Sliced $9.56 to $13.12, as compared with $3.65 to $5.15, $3.65 to $5.20 and $6.85 to $8.70 respectively in May.

Pepper.—Singapore Black fell from $8.25 to $7 per picul, averaging $7.55 as compared with $8.25 in May. Muntok White fell from $14.50 to $13, averaging $13.75 per picul as compared with $14.50 in May. The market for Singapore White continued nominal with no quotations.

Nutmegs.—110's fell from $28 to $24 per picul, averaging $26.80; 80's fell from $37 to $25 averaging $32.80. The May averages were $28 and 37 respectively.

Penang dried nutmegs were sold at $24 per picul.

Mace.—Siouw continued a nominal market with no quotations. Amboina fell from $57 to $45 per picul, averaging $51.60 as compared with $57 at the close of May.

Locally produced mace, dry, was sold in Penang at $75 per picul.

Cloves.—Continued a nominal market with no quotations.

Cardamoms.—Green cardamoms were quoted in *The Ceylon Chamber of Commerce Weekly Report* of 17th June, 1940, from Rs. 1.20 to Rs. 1.33 per lb.

Miscellaneous.

Derris.—Prospects of a further increase in freight rates had a stimulating effect on demand during the latter part of June. The improvement came too late, however, to influence the average prices for the month, which were slightly below those of May. Average prices per picul were as follows:—$10.50 to $11.50 for roots sold on a basis of ether extract; $20 to $22.50 for roots sold on rotenone content.

Gambier.—Cube No. 1 was quoted throughout the month at $17 per picul as compared with the May average price of $15.25. The market for Block continued nominal with no quotations.

Sago.—Pearl fell from $8.75 per picul to $8, averaging $8.40, and Flour, Sarawak Fair, fell from $6 to $5.75, averaging $5.90. The May average prices were $8.69 and $6 respectively.

Tapioca.—Flake Fair fell from $9 to $7.50 per picul, averaging $8.30. Seed Pearl fell from $9.50 to $8, averaging $8.80, and Medium Pearl fell from $9.50 to $8.50, averaging $8.90. The May average prices were $9, $9.62 and $9.75 respectively.

Tobacco.—Prices of prepared tobacco per picul in Kelantan during June were: 1st quality $90 to $168, 2nd quality $60 to $128, 3rd quality $40 to $112. In Perak Central the three grades of cured leaf were: $33 to $35; $25; $13 to $18, and for cut tobacco $56; $38; $27. In Perak South the three grades were: $40; $35; $30; prepared tobacco was 70 cents per kati. In Selangor cut tobacco was 80 cents to $1.20 per kati. In Pahang the three grades were: $23 to $35; $15 to $26; $10 to $14. In Negri Sembilan the 2nd grade was $18 to $25, and the 3rd grade $16 to $18. In Pahang and Province Wellesley the three grades were: $35.50; $26; $11. In Johore cured leaf was $10 to $42, and prepared tobacco $40 to $144.

The above prices are based on London and Singapore daily quotations for rubber, on the Singapore daily prices for copra, on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports and certain coffee prices are kindly supplied by Guthrie & Co., Ltd., Kuala Lumpur, local palm oil prices by Whittall & Co., Kuala Lumpur, the Singapore prices of imported coffee and arecanuts by Lianqui Trading Company of Singapore, and Singapore derris prices by Hooglandt & Co., Singapore.

1 picul = 133 1/3 lbs. The dollar is fixed at 2s. 4d.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Trafalgar Square, London, W.C.2.

MALAYAN AGRICULTURAL EXPORTS, APRIL, 1940.

Product	Net Exports in Tons				
	Year 1939	Jan./April 1939	Jan./April 1940	April 1939	April 1940
Arecanuts ...	38,489	14,382	15,436	3,794	3,548
Coconuts fresh†‡ ...	97,275†	34,454†	27,160†	9,592†	7,357†
Coconut oil‡ ...	61,360	17,520	21,714	4,527	5,955
Copra‡ ...	34,420	6,748	1,468	3,041	5,840
Copra cake ...	10,707	2,377	4,301	523	1,147
Gambier, all kinds ...	1,572	583	256	122	57*
Palm kernels ...	10,774	3,369	3,369	545	1,263
Palm oil ...	59,712	15,980	14,817	3,902	2,811
Pineapples, canned ...	65,802	28,263	16,903	9,277	4,252
Rubber¶ ...	361,484¶	106,457¶	174,889¶	27,695¶	49,413¶
Sago,—flour ...	9,583	2,622	892	306	646
,, —pearl ...	3,883	1,183	1,215	387	281
,, —raw ...	4,435*	1,493*	2,193*	605*	729*
Tapioca,—flake ...	1,068	335	341	83	66
,, —flour ...	2,706*	1,087*	524*	233*	114*
,, —pearl ...	18,277	5,185	4,567	1,601	1,620
Derris ...	1,356	431	485	73	115
‡Copra equivalent ...	136,075	35,908	37,296	10,589	15,664

† hundreds in number. * net imports. ¶ production.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates).

Month 1940	Palm Oil			Palm Kernels		
	F.M.S.	U.M.S.	Malaya	F.M.S.	U.M.S.	Malaya
January ...	2,007.6	2,474.0	4,481.6	434.3	497.0	931.3
February ...	1,937.9	1,914.7	3,852.6	411.1	454.0	865.1
March ...	2,081.5	1,895.6	3,977.1	445.3	388.1	833.4
April ...	2,104.3	1,820.7	3,925.0	420.8	370.0	790.8
May ...	2,124.3	2,054.1	4,178.4	414.5	401.0	815.5
Total ...	10,255.6	10,140.5	20,396.1	2,126.0	2,110.1	4,236.1
Total January to May, 1939 ...	11,275.5	10,586.7	21,862.2	2,067.0	1,798.1	3,865.1
Total for the year 1939 ...	30,157.7	27,215.0	57,372.7	5,639.3	4,533.1	10,172.4

Stocks on estates as at 31st May, 1940, were : palm oil 3,812 tons, palm kernels 1,791 tons.

ACREAGES OF TAPPABLE RUBBER ACTUALLY TAPPED AND NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 31ST MAY, 1940.

STATE OR TERRITORY	Estimated Acreages of Tappable Rubber (9)+(11)	ACREAGES OF TAPPABLE RUBBER NOT TAPPED				Area of tappable rubber never been tapped (b)		Total area not tapped (3)+(5) (c)		TOTAL AREA TAPPED DURING THE MONTH		Area of tappable rubber rested under rotational systems (c)	
		On estates which have entirely ceased tapping		On estates which have partly ceased tapping (a)									
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)	Acreage	Percentage of (9) to (2)	Average	Percentage of (11) to (2)	Acreage	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S.S.—													
Province Wellesley ...	42,587	114	0.3	10,028	23.5	508	1.2	10,142	23.8	32,445	76.2	7,912	18.6
Malacca ...	115,876	1,538	1.3	19,104	16.5	1,510	1.3	20,642	17.8	95,234	82.2	24,499	21.1
Penang ...	2,601	nil	nil	827	31.8	35	1.3	827	31.8	1,774	68.2	60	2.3
Singapore ...	31,256	5,613	18.0	5,634	18.0	241	0.8	11,247	36.0	20,009	64.0	3,371	10.8
Total S.S. ...	192,320	7,265	3.8	35,593	18.5	2,294	1.2	42,858	22.3	149,462	77.7	35,842	18.6
F.M.S.—													
Perak ...	280,631	5,069	1.8	37,551	13.4	6,230	2.2	42,620	15.2	238,011	84.8	41,406	14.8
Selangor ...	310,998	3,352	1.1	31,801	10.2	4,332	1.4	35,153	11.3	275,845	88.7	47,630	15.3
Negri Sembilan ...	256,507	5,738	2.2	42,534	16.6	7,765	3.0	48,272	18.8	208,235	81.2	34,298	13.4
Pahang ...	85,580	1,659	1.9	13,657	16.0	3,701	4.3	15,316	17.9	70,264	82.1	8,019	9.4
Total F.M.S. ...	933,716	15,818	1.7	125,543	13.4	22,028	2.4	141,361	15.1	792,355	84.9	131,353	14.1
U.M.S.—													
Johore ...	473,332	8,339	1.7	82,239	17.4	29,032	6.1	90,578	19.1	382,754	80.9	56,938	12.0
Kedah ...	192,953	7,070	3.7	16,484	8.5	6,057	3.1	23,554	12.2	169,399	87.8	37,252	19.3
Kelantan ...	31,110	403	1.3	4,630	14.9	1,275	4.1	5,033	16.2	26,077	83.8	5,788	18.6
Trengganu (d) ...	4,817	nil	nil	nil	nil	nil	nil	nil	nil	4,817	100.0	1,639	34.0
Perlis (e) ...	1,450	126	8.7	434	29.9	132	9.1	560	38.6	890	61.4	154	10.6
Brunei ...	5,974	nil	nil	1,488	24.9	270	4.5	1,488	24.9	4,486	75.1	1,131	18.9
Total U.M.S. ...	709,636	15,938	2.3	105,275	14.8	36,766	5.2	121,213	17.1	588,423	82.9	102,902	14.5
Total MALAYA ...	1,835,672	39,021	2.1	266,411	14.5	61,088	3.3	305,432	16.6	1,530,240	83.4	270,097	14.7

Notes.—(*a*) Area out-of-tapping on estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.

(*b*) The acreage shown in column (7) is included in columns (3) and (5).

(*c*) Areas of tappable rubber rested under rotational systems are not considered as out-of-tapping and therefore columns (11) and (12) include columns (13) and (14) respectively.

Acreage, Stocks, Production, Imports and Exports of Rubber, including Latex, Concentrated Latex and Revertex, for the month of May, 1940, in Dry Tons.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January to May 1940		during the month		January to May 1940						
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to May 1940	during the month	Jan. to May 1940	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to May 1940
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Malay States :—																				
Federated Malay States ...	...	6,549	20,462	13,512	66,720	6,497	42,067	Nil	Nil	Nil	Nil	18,037	5,382	74,867	40,381	...	4,986	18,532	83	195
Johore ...	...	2,565	7,948	5,884	30,405	5,521	27,101	Nil	98	Nil	433	3,933	8,863	17,615	42,094	...	2,146	7,074	...	...
Kedah ...	...	442	4,619	3,238	16,183	1,165	6,878	Nil	Nil	Nil	Nil	1,897	2,796	9,386	15,716	...	317	4,445	...	...
Perlis ...	...	35	35	15	81	28	158	Nil	Nil	Nil	Nil	Nil	50	Nil	240	...	19	44	...	...
Kelantan ...	...	209	679	391	1,934	1,138	5,033	Nil	Nil	Nil	Nil	149	1,293	756	6,239	...	339	636	...	...
Trengganu ...	...	58	197	187	918	330	1,773	Nil	Nil	Nil	Nil	5	511	10	2,743	...	41	215	...	...
Brunei ...	...	6	72	55	307	87	446	...	...	...	...	...	139	...	752	...	14	67	...	...
Total Malay States	...	9,864	34,003	23,282	116,548	14,766	83,456	Nil	98	Nil	433	24,021	19,034	102,634	108,165	...	7,862	31,013	83	195
S. Settlements :—																				
Malacca ...	...	2,055	1,746	1,257	6,212	763	4,222	Nil		Nil		2,193		12,669		...	2,662	1,640	...	...
Province Wellesley ...	...	1,817	834	505	2,418	250	1,295	Nil		Nil		11,543		45,503		...	1,395	823	...	...
Penang ...	2,954	3,568	18	21	103	93	555	2,329	21,579	12,958	101,993		Nil		Nil	3,491	2,507	10	...	...
Singapore ...	10,701	25,016	285	148	811	38	333	14,573		99,129		36,925		144,894		7,803	18,969	281	15	83
Labuan ...	...	34	Nil	Nil	Nil	17	76	44		269		Nil		Nil		...	29	Nil	...	...
Total Straits Settlements ...	13,655	32,490	2,882	1,931	9,544	1,161	6,481	16,946	21,579	103,356	101,993	50,661	Nil	203,066	Nil	11,294	25,562	2,754	15	83
Total Malaya ...	13,655	42,354	36,886	25,213	126,092	15,927	89,937	16,946	21,677	103,356	102,426	74,682	19,034	305,700	108,165	11,294	33,424	33,767	98	278

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
Dry Rubber	4,250	17,989	2,310	3,830	1,676	171
Wet Rubber	736	980	197	270	470	146
Total ...	4,986	18,969	2,507	4,100	2,146	317

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to May 1940
29	30	31
Singapore ...	53,411	218,058
Penang ...	14,193	59,028
Port Swettenham.	7,078	27,705
Malacca ...	Nil	909
Malaya ...	74,682	305,700

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to May 1940
32	33	34
Malay States ...	42,961	210,217
Straits Settlements	2,663	15,747
Malaya ...	45,624	225,964

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula : Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 25th June, 1940

METEOROLOGICAL SUMMARY, MALAYA, MAY, 1940.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Kuala Lumpur Aerodrome Selangor ...	91.6	74.7	83.1	96	72	85	77	85.7	86.7	11.76	298.7	2.28	17	16	9	3	—	183.35	5.91	48
Port Swettenham Aerodrome, Selangor ...	90.0	73.7	81.9	95	71	83	76	86.8	87.3	12.96	329.2	2.23	19	18	5	—	—	196.35	6.33	51
Sitiawan, Perak ...	90.2	75.3	82.7	93	73	86	78	84.9	85.5	5.01	127.3	1.20	16	9	4	—	—	203.95	6.58	53
Ipoh Aerodrome, Perak ...	91.5	74.0	82.7	96	72	88	76	84.9	85.7	6.54	166.1	2.06	16	15	2	—	—	197.10	6.36	52
Temerloh, Pahang ...	91.9	73.8	82.9	96	71	87	78	87.3	88.1	6.24	158.5	1.29	21	18	1	7	—	205.20	6.62	54
Kuala Lipis, Pahang ...	90.7	73.3	82.0	95	71	85	76	84.8	86.0	13.81	350.8	2.54	22	17	9	23	—	185.40	5.98	49
Kuala Pahang, Pahang ...	88.5	75.5	82.0	92	72	85	78	87.8	88.9	4.89	124.2	1.56	13	10	—	—	—	238.95	7.71	63
Kallang Aerodrome, S'pore ...	86.9	77.2	82.1	89	75	81	81	83.9	84.7	5.32	135.1	1.93	14	10	2	—	—	173.65	5.60	46
Bayan Lepas Aerodrome Penang ...	88.5	75.9	82.2	92	73	84	79	86.0	87.7	13.41	340.6	2.98	22	18	3	—	1	202.65	6.54	53
Malacca Town, Malacca ...	86.6	75.1	80.9	90	72	81	77	86.5	87.5	8.68	220.5	2.43	16	12	5	—	1	196.80	6.35	52
Kluang, Johore ...	89.4	72.5	80.9	94	71	82	75	83.4	83.9	13.65	346.7	2.35	23	19	6	13	—	163.85	5.29	43
Mersing, Johore ...	90.0	73.3	81.7	93	71	85	75	85.8	85.5	6.07	154.2	1.84	11	9	4	1	—	210.75	6.80	56
Alor Star, Kedah ...	90.3	75.3	82.8	94	72	83	78	86.1	87.9	8.39	213.1	1.78	23	16	5	3	—	208.20	6.72	54
Kota Bahru, Kelantan ...	91.6	75.2	83.4	94	72	88	78	86.5	86.3	7.30	185.4	2.90	11	8	3	—	—	240.60	7.76	63
Kuala Trengganu, Trengganu	90.5	74.1	82.3	94	72	84	76	*	*	4.14	105.2	1.39	8	7	4	—	—	241.80	7.80	63
Labuan ...	87.9	77.8	82.9	93	74	84	81	86.1	88.1	16.82	427.2	5.39	18	14	4	—	—	245.90	7.93	64
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	76.2	64.4	70.3	79	61	73	66	73.7	73.9	10.15	257.8	3.30	24	17	2	11	1	144.20	4.65	38
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	74.3	58.6	66.5	78	53	70	64	71.5	70.4	10.14	257.6	1.65	25	21	1	5	—	125.55	4.05	33
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	73.3	61.5	67.4	76	59	69	63	*	*	9.31	236.5	1.31	22	21	—	—	—	136.85	4.41	36